A Compilation of Plant Diseases and Disorders in Indiana - 1986

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Introduction

The Plant Diagnostic Clinic in the Department of Botany and Plant Pathology at Purdue University is a service of the Cooperative Extension Service, Purdue Agricultural Experiment Station. Plant disease diagnosis and weed identification are gratuitous services offered by the clinic. Of the 1300 specimens received annually, approximately 85% are submitted by county extension agents. The remainder of samples come directly from commercial growers, homeowners, private consultants and other interested persons. This paper is a summary of the major plant diseases and disorders which were diagnosed in the clinic and observed throughout the state in 1986.

Methods

Plant specimens are submitted to the Plant Diagnostic Clinic from county extension agents, homeowners, growers, nursery operators, consultants, and others. Specimens are diagnosed visually or by culturing the pathogen on selected media. Some virus diseases are diagnosed by the leaf dip (negative stain) technique utilizing the electron microscope. Once a disease or disorder is diagnosed, appropriate control measures are suggested. A summary of the samples diagnosed from January 1 through November 26, 1986 is given in Table 1.

Results

The incidence and severity of infectious diseases were greatly influenced by extremes in environmental conditions in 1986. Severe hard freezes in April caused extensive injury to the new growth of many woody ornamentals. Frequent rainfall in late May and early June resulted in a high incidence of various fungal leafspot diseases. Drought conditions in July and August resulted in widespread site-related problems. Whitening of leaves due to drift of the herbicide 'Command' onto vegetables, ornamentals, shade and fruit trees, and other vegetation caused numerous complaints.

Shade and Ornamental Trees

Diseases: As in previous years (1,2,3,4,5,6,7) leaf and petiole anthracnose was common on ash, sycamore, oak and maple. Sycamores experienced extensive leaf drop in late spring due to anthracnose infection of the petioles. Severe defoliation was also common on hard maples (especially Norway) in late summer due to petiole and leaf infection. Apple scab on crabapples was severe by mid-summer. Actinopelte leaf spot of pin oak was widespread by late summer. Diplodia tip blight on Austrian and Red pine as well as Verticillium wilt on redbud, smoke tree and maple were diagnosed.

Disorders: Severe hard freezes in April caused extensive injury to the new growth of many trees; especially the honeylocust and ginko. Iron chlorosis of pin oak (in conjunction with Actinopelte leaf spot) was very prevalent in late summer, in part due to the extended dry periods which occurred at this time.

Ornamentals

Diseases: Juniper twig blight (both *Kabatina* and *Phomopsis*) was evident during early spring, as were cedar apple, cedar hawthorn and cedar quince rust. Powdery mildew

TABLE 1. Plant samples received in the Purdue Plant Diagnostic Clinic Jan. 1 through Nov. 26, 1986.

Plant Specimen	Number of Samples	Diseases[1]	Disorders[2]	Chem.[3]	Nutr.[4]	Insect[5]	Other[6]
AGRONOMIC							
Corn	92	34	32	18	8	9	11
Soybeans	94	59	9	26	1	1	14
Small Grain	67	59	13	1	1	0	11
Forage Grasses and Legumes	25	16	2	1	4	3	4
ORNAMENTAL							
Trees-Shade and Ornamental	329	105	159	20	16	51	47
Shrubs and Groundcover	111	29	42	7	2	10	26
Flowers	76	29	42	7	2	9	18
House plants	16	4	6	0	1	3	3
FRUIT							
Tree Fruit	85	30	26	5	2	11	11
Small Fruit	64	29	20	2	1	3	9
VEGETABLE	70	28	9	11	5	3	26
TURFGRASS	57	34	11	0	0	0	16
PLANT IDENTIFICATION	144	—	—	—	—		
TOTAL	1230	466	335	96	49	103	196

[1] Problems caused by an infectious disease causing agent, e.g. fungus, bacterium, virus, mycoplasma, nematode.
[2] Problem caused by noninfectious environmental stress, e.g. wind, drought, heat, soil compaction.
[3] Problem caused by herbicide/pesticide misuse.
[4] Problem caused by a nutrient imbalance.
[5] Problem caused by an insect. Does not include samples submitted to Entomology Diagnostic Clinic.
[6] "Other" includes the causal agent categories: No disease, and inadequate sample for diagnosis.

was common during the late summer period on lilac, zinnia, dahlia and numerous other susceptible hosts. Bacterial blight of geranium (*Xanthomonas pelargonii*) and Fusarium wilt of chrysanthemum were the most frequently recorded diseases of greenhouse crops.

Disorders: Severe April freezes caused dieback of the new growth on many ornamentals. A mild, wet November followed by a cold and dry December did not allow proper hardening off of roses resulting in extensive cane injury.

Tree Fruits

Diseases: Fire blight was epidemic in southern Indiana. Many growers reported 1986 as the "worst year ever" for fire blight. Though blight was epidemic in only the southern third of the state, orchards in all areas of Indiana experienced above normal fire blight. Bacterial spot of peach caused extensive leaf yellowing and defoliation in a number of southern Indiana orchards during early spring. Sooty blotch and fly speck were the most noticeable fruit problems on apple.

Disorders: Severe hard freezes in April resulted in extensive fruit bud kill and consequent crop loss of all tree fruits. On apples, Red Delicious suffered the heaviest damage with many growers reporting a complete crop loss. Peach, nectarine and other stone fruits also suffered extensive crop loss. Bitter pit (calcium deficiency disorder) was frequently diagnosed on apple fruit.

Small Fruits

Diseases: Septoria leaf spot and Botrytis fruit rot were very common during late September on raspberry and other brambles. Strawberry leaf diseases were also prevalent during the late summer-early fall period. Black rot of grape was frequently diagnosed on samples from homeowners and commercial growers.

Disorders: Significant crop loss occurred on strawberries due to the severe April freezes. A mild, wet November followed by a cold and dry December did not allow proper hardening off of many brambles resulting in extensive cane injury. Growth regulator drift injury on grapes was frequently diagnosed.

Agronomic Crops

Diseases — Wheat: Yield losses in 1986 were due to several diseases and were estimated to be 26% for the state. Yield losses of 40 to 60% were experienced in many fields, and a few fields were not harvested due to low yield and/or poor quality. *Septoria nodorum glume blotch* (*Leptosphaeria nodorum*) was widespread over the entire state and head scab (*Gibberella zeae*) was extremely severe in the northern half. The mycotoxin deoxynivalenol (DON) was associated with the head scab (*G. zeae*). Some grain was rejected at county elevators due to excessive scabby kernels or low test weight. Test weights of 47 to 50 pounds/bu. were not uncommon in northwestern Indiana. In addition, powdery mildew (*Erysiphe graminis* f. sp. *triticii*), Septoria nodorum leaf blotch (*L. nodorum*) and leaf rust (*Puccinia recondita*) were common foliar diseases. While not rated as severe, stem rust (*Puccinia graminis* f. sp. *triticii*) was observed to be at its highest levels in many years. Take-all (*Gaeumannomyces graminis* var. *triticii*) and barley yellow dwarf (Barley Yellow Dwarf Virus) wre reported, but their significance paled in comparison with the foliar and head diseases. Wheat spindle streak (Wheat Spindle Streak Mosaic Virus) was unimportant in 1986.

Diseases — Corn: Corn diseases were pesky in areas during 1986. In a few localized fields in southern Indiana, northern corn leaf blight (*Exerohilum turcicum* syn. *Helminthosporium turcicum*) Races 1 and 2 caused severe damage. Yield losses of over 50% were reported, especially from fields planted in April and where corn followed corn with reduced tillage practices. Gray leaf spot (*Cercospora zeae-maydis*) was found in several southern Indiana areas, and caused severe yield losses in a few fields. While this disease was observed in southeastern Indiana a few years ago, gray leaf spot was more widespread in 1986 than any previous year. Southern corn leaf blight Race 0 (*Bipolaris maydis*), northern corn leaf spot (*Helminthosporium carbonum*), and common rust (*Puccinia sorghi*) were common in the state. Ear rots caused by *Gibberella zeae*, and *Fusarium moniliforme* were spotty but relatively common. Damage from ear rots was not generally considered severe. Diplodia ear rot (*Diplodia maydis*) was again reported from south central and south eastern counties where corn followed corn with reduced tillage practices. Stalk rots caused by the soil-borne pathogens *Gibberella zeae*, and *Fusarium moniliforme* were widespread and caused severe lodging in many fields in the state. Diplodia stalk rot (*D. maydis*) was reported from some fields in south central and south eastern Indiana. Corn Sorghum Downy Mildew was diagnosed for the first time at the Purdue Agronomy Farm, West Lafayette.

Diseases — Soybean: Heavy rainfall during the last half of May resulted in flooding damage and seedling blights (*Phytophthora megasperma* var. *sojae* and *Pythium* spp.) in many of the fields that were planted prior to the start of the wet weather. Rhizoctonia root rot (*Rhizoctonia solani*) was again observed to be moderately severe in some fields. Phytophothora root rot (*P. megasperma* var. *sojae*), brown stem rot (*Phialophora gregata*) and charcoal root rot (*Macrophomina phaseolina*) were soil-borne diseases that were

observed in areas of the state and occasionally caused significant yield losses. Sclerotinia stem rot (*Sclerotinia sclerotiorum*) was again observed in a few eastern Indiana fields. The soybean cyst nematode (*Heterodera glycines*) continued to spread into previously unreported areas. Johnson and St. Joseph counties were confirmed to have soybean cyst nematode infestations for the first time in 1986. Sudden Death Syndrome was observed in a few counties, primarily in southwestern Indiana, but the occurrence and severity of this disorder was much less severe than in 1985. The dry August weather that occurred throughout the state is assumed to be partially responsible for the reduced incidence and severity. Pod and stem blight (*Diaporthe phaseolorum* var. *sojae* or *Phomopsis* spp.) and seed molds (various fungi) were reported to be severe in those fields that were harvested after the fall rains.

Diseases — Alfalfa: Common leaf spot, *Leptosphaerulina* leafspot, and stem anthracnose were commonly diagnosed. Phytophthora root rot and crown root rot complex were also noted.

Turfgrasses

Diseases: As in previous years (4, 5, 6, 7) leaf spot and melting out disease caused by *Dreschlera* spp. were common during May and June. In some areas, this disease complex was severe. Necrotic ring spot (*Leptosphaeria korrae*) and summer patch (*Phialophora graminicola*) were moderately severe in Kentucky bluegrass turfs during the summer months. *L. korrae* was also diagnosed in a bentgrass specimen from a putting green in the Indianapolis area. Dollar spot (*Lanzia* spp. or *Moellerodiscus* spp.), Pythium (*Pythium* spp). and brown patch (*Rhizoctonia solani*) were commonly reported on bentgrasses. Rusts (*Puccinia* spp.) were widespread on several turfgrass species. Red thread (*Laetisaria fuciformis*) was diagnosed but appeared to be a minor sporadic problem. Fairy rings and various mushrooms were common complaints during 1986.

Disorders: The months of July and August were very dry, and the combination of drought and near-normal summer temperatures resulted in considerable stress on turfgrasses throughout the state. This stress alone or in combination with disease or other stress resulted in considerable damage to turf areas.

Vegetables

The 1986 growing season witnessed the occurrence of a wide variety of vegetable diseases. Some resulted in severe local problems, but few developed into serious epidemics of regional proportions. The most unexpected observation was the marked decline in incidence of bacterial canker of tomato. (*Clavibacter michiganese* pv *michiganese*). Bacterial canker was diagnosed in very few (less than 5%) fields in 1986 compared with its occurrence in more than 90% of Indiana tomato fields in 1985. The most expected observation was the attack on cucurbits by powdery mildew (*Sphaerotheca fuliginea*). Fortunately, Indiana growers were well prepared for the assault and reduced losses with a variety of control tactics. The following paragraphs document major vegetable diseases that occurred in 1986.

Diseases — Crucifers: Early season crucifers escaped the usual, major diseases (1, 2, 3, 4, 5). However, white rust (*Albugo candidans*) was identified on cauliflower, horseradish, and mustard greens in the northern part of the state. The greens were most severely affected by this disease which has not been identified in Indiana in the past five years. Diseases diagnosed on late season crucifers included black rot (*Xanthamonas campestris*) downy mildew (*Peronospora parasitica*), and club root (*Plasmodiophora brassica*). The fact that black rot was particularly widespread probably coincides with the wet weather that occurred in September and early October.

Disorder — Crucifers: Brown bud of broccoli, a physiological disorder was diagnosed in several fields and also was associated with excess moisture.

Diseases — Cucurbits: Bacterial wilt of muskmelon (*Erwinia tracheiphila*) was more severe in 1986 than in past years. The incidence of wilt was high also among cucumbers, squash, and pumpkins. Fusarium wilt of watermelon (*Fusarium oxysporum* f. sp. *niveum*) and muskmelon (*F. oxysporum* f. sp. *melonis*) continues to be well managed with resistant melon cultivars. Gummy stem blight (*Didymella bryoniae*) developed into a severe problem on irrigated watermelons. Fungicides provided adequate control where overhead irrigation was not used. The same fungus caused black rot of squash and pumpkin and occurred with moderate frequency. Alternaria leaf blight (*Alternaria cucumerina*) remains the most important disease of muskmelons. Production normally is discontinued in most muskmelon fields in southwestern Indiana because foliage is consumed and plants are killed by Alternaria infections. Powdery mildew was observed in muskmelon fields as early as June 16. It created economic problems on muskmelons, squash, and pumpkins in fields where no attempt was made to control the mildew. Downy mildew (*Pseudoperonospora cubensis*) occurred on late season cucurbits such as butternut squash and pumpkins but did not appear to cause economic problems.

Diseases — Tomatoes, Peppers, and Potatoes: Bacterial speck (*Pseudomonas tomato*) and Septoria leaf spot (*Septoria lycopersici*) were the two most troublesome diseases of tomatoes. Fresh market losses to Septoria leafspot were especially severe in some fields; the disease was not a problem in many others. Early blight (*Alternaria solani*) and anthracnose (*Colletotrichum coccodes*) occurred with regular frequency in most fields and caused major problems in a few. Bacterial spot (*Xanthamonas vesicatoria*) was not diagnosed on tomatoes but caused extensive losses to many bell pepper fields. Several direct-seeded pepper fields suffered total losses to bacterial spot, an indication that the pathogen was seed-borne. Damping off and wire stem of pepper seedlings caued by *Rhizoctonia solani* occurred to a very minor extent in northern Indiana. The most frequent disease problems observed on potatoes were scab (*Streptomyces scabies*) and Rhizoctonia canker.

Discussion

Every year plant diseases continue to destroy the farmers' crops, the gardener's vegetables, the home maker's flowers, the trees, shrubs, and lawns which beautify our homes. Occasionally fungi bring about human illness and are responsible for poor gains in livestock as a result of contaminated hay and grain.

Plant diseases are saboteurs of efficient agriculture and the spoilers of suburban beauty. Many plant diseases can be controlled or prevented but as in human medicine there are still some which defy efforts of the scientists to unravel their mysteries. Nevertheless, it is up to those of us entrusted with the task of promoting better farming and better living to realize that we have always with us many unseen competitors for our foodstuffs and many destroyers of our ornamental plants. Through proper understanding of the ways in which plant diseases develop and by promoting and encouraging proper methods of prevention or control a great majority of our plant diseases can be controlled and the losses that they cause materially reduced.

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